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Research Article

A Clinical Study of Maternal Complications and Perinatal Outcomes in Diabetes Complicating Pregnancy

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Abstract: The objective of the study was to evaluate the maternal complications and perinatal outcomes in diabetes complicating pregnancy. It was a prospective cohort study performed in J S S Hospital Mysore in 50 antenatal patients with diabetes admitted to J S S Hospital during the period of November 2007 to July 2009. Maternal complications included preeclampsia, polyhydramnios, preterm delivery, infections, mode of delivery and shoulder dystocia. Perinatal outcomes included macrosomia, hypoglycemia, hyperbilirubinemia, congenital malformations, respiratory distress and perinatal mortality. Of the 50 cases 90% (45) were gestational diabetes mellitus, 6% (3) type I diabetes mellitus and 4% (2) type II diabetes mellitus. Rate of pre eclampsia was 20.83%, preterm delivery 16.66%, polyhydramnios 16.66% and maternal infection 4.16%. Rate of cesarean section was 67.39%. The rate of congenital malformations was 2.08%, hyperbilirubinemia 27.08%, hypoglycemia 14.58%, respiratory distress syndrome 12.5% and perinatal mortality rate was 8.33%. In conclusion, pre-eclampsia, preterm delivery and polyhydramnios were the most common antenatal complications. Hyperbilirubinemia is the most common neonatal complication requiring NICU admission. Preterm delivery was significantly associated with perinatal mortality.
Keywords: Gestational diabetes mellitus , Pregestational diabetes, Maternal complications, Perinatal outcome.

INTRODUCTION

Diabetes is the most common endocrine disorder complicating pregnancy. Incidence of both Type I and Type II diabetes is increasing throughout the world. As the incidence of diabetes continues to rise and increasingly affects individuals of all ages including young adults and children, women of childbearing age are at increased risk of diabetes during pregnancy [1].

Diabetes may manifest itself for the first time in pregnancy – gestational diabetes or a diabetic woman may become pregnant (pregestational diabetes mellitus). WHO defines gestational diabetes mellitus as 'carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy [2].

Indian women have an eleven fold increased risk of developing glucose intolerance during pregnancy compared to Caucasian women [3]. The recent data shows 16.5% prevalence of GDM in India [4]. Among ethnic groups in south Asian countries, the Indian women have the highest frequency of GDM [5].

Diabetes in pregnancy is associated with increased risks to the woman and to the developing fetus [6]. Gestational diabetes mellitus also increases the likelihood of subsequent diabetes in the mother, in high risk women the risk of recurrence in future pregnancies has been reported to be as high as 68% [7].

MATERIALS AND METHODS

This is a prospective cohort study conducted in the department of Obstetrics and Gynecology, J S S Medical College, Mysore, during the period of Nov 2007 to Jul 2009. Fifty women with diabetes complicating their pregnancy were included in the study. This study was approved by institutional ethical committee.

Inclusion criteria

Pregnant woman diagnosed as diabetics, both gestational and pregestational diabetes. This study was approved by institutional ethical committee.

Exclusion criteria

Pregnant women with diabetes having any other medical complications like essential hypertension, renal disease, heart disease or epilepsy.

Data collected in a predesigned proforma. Primary outcomes studied were maternal complications like pre-eclmapsia, polyhydramnios, preterm labour, maternal infections, maternal hypoglycemia, ketoacidosis, diabetic nephropathy and retinopathy.

Mode of delivery is noted. Perinatal outcomes studied were congenital malformations, neonatal complications like hypoglycemia, hyperbilirubinemia, respiratory distress syndrome, macrosomia, birth injuries, polycythemia, hypocalcemia. Perinatal mortality was also recorded. All the 50 women met the inclusion criteria. Out of which 46 women were followed until delivery and seven days postpartum.

Statistical analysis was done using Chi square test and logistic regression.

RESULTS

Total numbers of deliveries during the study period were 3044. Incidence of diabetes complicating pregnancy is 1.64%. Age of the cohort ranges between 19 to 43 years, mean age being 27.66 years.

Table 1: Maternal age distribution

Age (years)	Number (n=50)	Percentage
≤ 20	4	8
21 – 24	10	20
25 – 29	19	38
30 – 34	11	22
35 – 39	5	10
≥40	1	2

There were 45 (90%) gestational diabetes mellitus, 3 (6%) was type I diabetes mellitus and 4% (2) type II diabetes mellitus.

Table 2: Type of diabetes

Type	Number (n=50)	Percentage
GDM	45	90
Type I	3	6
Type II	2	4

Table 3: Parity distribution

Parity	Number (n=50)	Percentage
Primigravida	13	26
Multigravida	37	74

The following maternal complications were studied.

Table 4: Maternal complications

Complications	Number	Percentage
Pre-eclampsia	10	20.83
Polyhydramnios	8	16.66
Preterm labor	8	16.66
Infections	2	4.16
Ketoacidosis	0	-
Diabetic nephropathy	0	-
Diabetic retinopathy	0	-
Prelabor rupture of membranes	2	4.16
Shoulder dystocia	2	4.16
Maternal hypoglycemia	0	-

Forty six women delivered, 44 were live births and 2 were term intrauterine demise . There were two twin deliveries.

Table 5: Mode of delivery

Mode of delivery	Number (n=46)	Percentage
LSCS	31	67.39
Vaginal delivery	15	32.61

One woman underwent MTP at 16 weeks in view of anencephaly. Three women underwent dilatation and evacuation for missed abortion. One underwent cesarean hysterectomy for placenta previa with accreta leading to postpartum hemorrhage.

Table 6: Indications for cesarean section

Indication	Number (n=31)
CPD	7
Previous LSCS	11
Contracted pelvis	3
Fetal distress	2
Uncontrolled GDM	2
Breech presentation	2
Twin gestation	2
Failure to progress	1
Central placenta previa	1

There were 38 (82.61%) term deliveries and 8 (17.39%) preterm deliveries.

Birth weight of the babies ranges from 1.9 – 4.9 kgs. Mean birth weight is 3112±712 gms. There were 6 (12.5%) babies with birth weight > 4kgs.

Table 7: Birth weight

Birth weight in kgs	Number (n= 48)	%
< 2	1	2.08
2 – 2.9	16	33.34
3 – 3.9	25	52.08
≥ 4	6	12.5

Following neonatal complications were noted.

Table 8: Complications

Complications	Number (n=37)	Percentage
Hypoglycemia	7	14.58
Hyperbilirubinemia	13	27.08
Hypocalcemia	0	-
RDS	6	12.5
Polycythemia	2	4.17
Birth injuries	1	2.08
Perinatal mortality	4	8.33

There was one case of Erb's paresis, the baby recovered from the injury and there was no residual deficit.

There were 2 term intrauterine fetal demise, both the women had uncontrolled gestational diabetes. There

were two cases of neonatal death, both the babies were preterm.

DISCUSSION

Diabetes is the most common medical complication of pregnancy. Of late the prevalence of diabetes is increasing, which could be attributed to the urbanization, the obesity pandemic and physical inactivity [8].

The estimated lifetime risk of diabetes is higher at birth and throughout life for ethnic and racial minority groups than for non-Hispanic whites and for women compared to men. Prevalence rates are higher in African, Hispanic, Native American and Asian women than in white women.

Diabetes during pregnancy either gestational or pregestational increases the maternal and perinatal morbidity and mortality.

Table 9: Comparision of Maternal complications

Complication	Present study (%)	Casey BM et al. [9] (%)	Zhu L et al. [10] (%)	Evers IM et al. [11] (%)
Pre eclampsia	20.83	17	25.8	12.7
Preterm delivery	16.66	-	16.6	32.2
Caesarean section	67.39	30	36.7	44.3
Shoulder dystocia	4.16	3	-	

Huddle K R [12] reported caesarean section rate of > 60percentage and Kapoor N *et al*. [13] reported 67% the following results were correlating with the present study.

Present study showed significant association between preterm delivery and perinatal mortality.

Risk of polyhydramnios in the study was 16%. Sobande *et al*. [14] reported polyhydramnios as the most common antenatal complication, significantly higher in Type I diabetes mellitus. Danne F *et al*. [15] reported risk of developing polyhydramnios 3 times higher in diabetic compared to non diabetic pregnant women.

Table 10: Comparision of Neonatal complications

Neonatal complications	Present study (%)	Malinoska *et al*. [16] (%)	Evers IM *et al*. [11] (%)	Galindo *et al*. [17] (%)
Congenital malformations	2	4.3	8.8	13.4
Macrosomia	12.5	-	45.1	-
Hyperbilirubinemia	27.08	17.3	-	-
Hypoglycemia	14.58	15.6	-	-
Perinatal mortality	8.33	-	2.8	2.5

Gajjar F *et al*. [18] reported 3 fold increased risk of hyperbilirubinemia and 8 fold risk of hypoglycemia in the neonate of women with GDM.

Kapoor N *et al*. [13] reported 10 times higher risk of congenital malformations and 4 – 7 times higher risk of perinatal mortality in GDM.

Fetal malformations are more common with poor metabolic control in early pregnancy. The most frequent malformations observed are heart defects.

Infants born to women with GDM were significantly larger (mean birth weight 3584±616 gms versus 3290±546 gms, p value <.001)12.

CONCLUSION

Gestational diabetes was more prevalent in the study cohort. Pre-eclampsia preterm delivery and polyhydramnios were the most common antenatal complications. Preterm delivery was significantly associated with perinatal mortality. Hyperbilirubinemia was the most common neonatal complication requiring NICU admission.

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